

WHAT IS CLAIMED IS:

1. An optical film comprising a transparent support with an antireflection layer substantially conformed in shape to the surface underlying the layer, the antireflection layer containing a binder polymer having dispersed polymer particles which are nanovoided so as to have a surface area greater than $50\text{m}^2/\text{gm}$ and which fill 64% or less of the layer volume.
2. The optical film of claim 1 wherein the particles have a median size less than 200 nm.
3. The optical film of claim 1 wherein the particles have a surface area greater than $200\text{ m}^2/\text{gm}$.
4. The optical film of claim 1 wherein the nanovoided polymer particles comprise a styrenic or an acrylic or a methacrylic monomer or fluorine derivatives thereof.
5. The optical film of claim 1 wherein the nanovoided polymer particles are cross-linked with a multifunctional monomer at 50 mole% or greater.
6. The optical film of claim 1 wherein the nanovoided polymer particles are cross-linked with a multifunctional monomer at 100 mole%.
7. The optical film of claim 1 wherein greater than 97 volume % of the entrapped nanovoid is contained within the nanovoided polymer particles.
8. The optical film of claim 1 wherein the nanovoided polymer particles comprise either spherical beads or particles with an irregular shape.
9. The optical film of claim 1 wherein said film is disposed as a single antireflection layer with a thickness below the wavelength of visible light.

10. The optical film of claim 1 wherein said film is disposed as more than one antireflection layer.

11. The optical film of claim 1 wherein said film is disposed on an underlying hardcoat layer.

12. The optical film of claim 1 wherein said does not diffuse any residual reflected light.

13. The optical film of claim 1 wherein said film is disposed on an underlying antiglare layer that does diffuse any residual reflected light.

14. The optical film of claim 1 wherein the nanovoiced particles are incorporated in an antiglare layer.

15. The optical film of claim 1 wherein the binder polymer is selected from the group consisting of cellulose triacetate, polyethylene terephthalate, diacetyl cellulose, acetate butyrate cellulose, acetate propionate cellulose, polyethersulfone, polyacrylic-based resin, polyurethane-based resin, polyester, polycarbonate, aromatic polyamide, polyolefins, polymers derived from vinyl chloride, polyvinyl chloride, polysulfone, polyether, polynorbornene, polymethylpentene, polyether ketone and (meth)acrylonitrile.

16. The optical film of claim 1 wherein the binder polymer is selected from an acrylic or a methacrylic polymer or fluorine derivatives thereof.

17. The optical film of claim 1 wherein the binder polymer is selected from polymethyl methacrylate or fluorine derivatives thereof.

18. The optical film of claim 1 wherein the binder polymer is cross-linked.

19. The optical film of claim 1 wherein the binder polymer and nanovoiced polmeric particles are cross linked to each other.
20. The optical film of claim 1 wherein said support is selected from the group consisting of cellulose triacetate, polyethylene terephthalate, cellulose diacetate, acetate butyrate cellulose, acetate propionate cellulose, polyethersulfone, polyacrylic-based resin, polyurethane-based resin, polyester, polycarbonate, aromatic polyamide, polyolefins, polymers derived from vinyl chloride, polyvinyl chloride, polysulfone, polyether, polynorbornene, polymethylpentene, polyether ketone and (meth)acrylonitrile containing polymers.
21. The optical film of claim 1 wherein said support is selected from the group of cellulose triacetate, polyethylene terephthalate, polynorbornene and polyethersulfone.
22. The optical film of claim 1 wherein said support is cellulose triacetate.
23. The optical film of claim 1 wherein additional compounds are added that include a member selected form the goup consisting of antistats, surfactants, emulsifiers, coating aids, lubricants, matte particles, rheology modifiers, antifoggants, inorganic fillers, pigments, magnetic particles, UV absorbers, and biocides.
24. The optical film of claim 1 wherein an anti-fingerprint layer is disposed over the anti-reflection layer.
25. An LCD display comprising the optical film of claim 1.
26. A touch screen display comprising the optical film of claim 1.

27. An optical element or lens or window or cover plate comprising the optical film of claim 1.

28. The optical film of claim 1 wherein the voiding of said nanovoiced particles is achieved by mixing a porogen with the monomers used to make said nanovoiced particles, dispersing the resultant mixture in water, and polymerizing said monomers to form said nanovoiced particles.

29. The optical film of claim 1 wherein the underlying surface is flat.

30. The optical film of claim 1 wherein the underlying surface is rough for glare reduction.